

portable electronic device in the landscape configuration in accordance with a preferred embodiment of the present invention.

[0014] FIG. 5 shows an isometric view of the underside of a circuit board and a flip cover of a multi-configuration portable electronic device in the closed configuration in accordance with a preferred embodiment of the present invention.

[0015] FIG. 6 is a flow chart illustrating the process by which alternative modes of operation of a multi-configuration device are actuated based on physical configuration in accordance with a preferred embodiment of the present invention.

#### DETAILED DESCRIPTION

[0016] The present invention, according to a preferred embodiment, overcomes problems with the prior art by providing a portable electronic device that integrates the functionality of multiple independent devices into a single portable device, while having an ergonomic user interface and display that are effective across different physical configurations and modes of operation, and while further having a relatively small overall size and weight.

[0017] In preferred embodiments, the present invention provides a multi-configuration portable electronic device having multiple modes of operation that are actuated by repositioning a body element (such as a flip cover) of the device to multiple alternative configurations (such as portrait, landscape, and closed configurations). Repositioning the body element changes the mode of operation of, for example, inputs, displays, and/or active software applications of the device. For example, the inputs can include an adaptable keypad, and repositioning the body element can cause the characters on the adaptable keypad to change, such as by switching between numeric and “QWERTY” keypad layouts. As another example, repositioning the body element can cause the display to switch between displaying images in either a portrait or landscape display format.

[0018] As yet another example, repositioning the body element can cause the active software application to switch, such as between a phone dialer application for a cellular (or wireless) phone and an organizer or text-messaging application for a PDA or text-messaging pager. Preferably, the mode of operation is changed “on the fly” without having to reload the operating system, software applications, drivers, etc., and without the need for a processor to continuously monitor the physical configuration of the device. By switching between configurations, the device can provide the functionality of multiple different types of devices in a single unit. For example, in one embodiment a device functions as a cellular phone (amongst other functions) in a portrait configuration, whereas the device functions as a PDA, handheld computer, or text-messaging pager in a landscape configuration. Thus, in preferred embodiments, the device automatically reconfigures its mode of operation to match its physical configuration.

[0019] FIGS. 1 and 2 illustrate an exemplary multi-configuration portable electronic device 100 (“device 100”) in accordance with a preferred embodiment of the present invention. FIG. 1 illustrates the device 100 in an exemplary “portrait” configuration, and FIG. 2 illustrates the device 100 in an exemplary “landscape” configuration.

[0020] The multi-configuration portable electronic device 100 includes a main body element 102 coupled to a flip cover body element 104. The device 100 also includes inputs 106 and a display 108. In this embodiment, the inputs 106 are disposed on the main body 102, and the display 108 is disposed on the flip cover 104. The inputs 106 include, for example, a keypad (or keyboard), as well as other input devices such as a mouse for navigating a cursor/pointer on the display. FIG. 1 also depicts an antenna 110 for the electronic communication device; an antenna may be absent in some embodiments.

[0021] In this embodiment of the present invention, the multi-configuration portable electronic device 100 can assume at least three different physical configurations: a “portrait” configuration (illustrated in FIG. 1), a “landscape” configuration (illustrated in FIG. 2), and a “closed” configuration. In the portrait configuration, the flip cover 104 is opened such that a long dimension of the flip cover 104, which is substantially rectangular in shape, is positioned in a substantially longitudinal position with respect to the main body 102 (as shown in FIG. 1), such as in typical cellular phone configurations. In the landscape configuration, the flip cover 104 is opened such that the long dimension of the flip cover 104 is positioned in a substantially lateral position with respect to the main body 102 (as shown in FIG. 2). The landscape configuration is typically appropriate for text messaging pagers, PDAs, or hand-held computers. To use the device 100 in either the portrait or landscape configuration, a user positions the flip cover 104 in either the portrait or landscape configuration, and thereby actuates the corresponding mode of operation of the device 100. According to this embodiment of the present invention, the user adjusts the physical orientation of the device 100 by rotating the device 100 substantially 90 degrees.

[0022] In a “closed” configuration (which is shown in FIG. 5), the flip cover 104 is rotated into contact with the main body 102 such that the flip cover 104 substantially covers the main body 102. Generally, the flip cover 104 is positioned in the closed configuration in order to close and protect the device 100 when not in use, such as during storage or when being carried. In the closed configuration, the device 100 is generally in a standby mode or turned off in order to conserve battery power. In further embodiments, the device does not have a closed configuration and/or has other configurations.

[0023] FIGS. 1 and 2 illustrate a portrait hinge 112, a landscape hinge 114, and a joint 116. The portrait hinge 112 enables the flip cover 104 to be rotated/pivoted between the portrait configuration (depicted in FIG. 1) and the closed configuration. The landscape hinge 114 enables the flip cover 104 to be rotated/pivoted between the landscape configuration (depicted in FIG. 2) and the closed configuration. The joint 116 enables the flip cover 104 to be rotated/pivoted between the portrait, landscape, and closed configurations. The hinge and joint assemblies used in this embodiment of the present invention are described in greater detail in U.S. patent application Ser. No. 10/150,244, which is hereby incorporated by reference.

[0024] The exemplary inputs 106 shown in FIGS. 1 and 2 include a keypad. In the portrait configuration illustrated in FIG. 1, the keypad functions as a numeric keypad typical of cellular phones. In the landscape configuration illustrated